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[54] FUZZY CONTROLLER FOR ACOUSTIC VEHICLE TARGET INTERCEPT GUIDANCE

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[57] **ABSTRACT**

A target intercept guidance system for directing a steerable object, such as a torpedo with an acoustic homing device. The guidance system senses the bearing and range between a first site and a second site and determines the position of a guidance point for the steerable object as it moves toward the second site. Two error functions are produced. The first error function represents the angle between the bearing from the guidance point of the steerable object to the second site and the course of the steerable object. The second error signal represents an estimate of the rate of change of that angle. These error signals are classified into first and second sensed linguistic variables based upon membership functions from the first and second sensed variable membership function sets to become fuzzy inputs that produce fuzzy outputs comprised of control output linguistic variables and corresponding control output membership functions from a control output membership function set based upon logical manipulation of the fuzzy inputs. These fuzzy control output membership functions are converted into an output having an appropriate form for control after being conditioned in response to other information including the relative positions of the guidance point of the steerable object and the second site.

11 Claims, 17 Drawing Sheets